NATURAL HERITAGE NEWS

The Newsletter of the Natural Heritage & Endangered Species Program
Inventorying and Protecting the Biological Diversity of the Commonwealth Since 1978

VOLUME 7, NUMBER 1 LATE WINTER 1998

The Biodiversity Initiative's Ecological Restoration Program

We have a new program for ecological restoration! A year ago, in January 1997, Trudy Coxe, Secretary of the Executive Office of Environmental Affairs, announced the Commonwealth's **Biodiversity Initiative** (BDI), a joint effort of the Department of Fisheries, Wildlife, & Environmental Law Enforcement and the Division of Fisheries & Wildlife (DFW). One million dollars was committed to BDI from the 1996 Open Space Bond for the first 18 months, with potentially several million more for the four remaining years of the bond. There are two complementary parts of the Biodiversity Initiative: the ***ecological restoration program*** in NHESP administered through the department and the ***upland habitat management program*** administered through DFW. These two programs were established to improve understanding of and reverse degradation of important habitats on our conservation lands in Massachusetts. The BDI goals are to promote and implement a land stewardship program that maintains and restores the native diversity of flora and fauna through active land management and restoration based upon sound ecological science.

Conducting a prescribed burn at Crane WMA in Falmouth

The ***ecological restoration program*** is focused on sites identified from our database of exceptional ecological significance on public lands under permanent conservation protection. Over the years, nearly half a million acres of land have been protected by conservation agencies in the Commonwealth. These lands and waters represent an extraordinarily successful effort to protect our natural resources. However, in many cases the biological resources - the plants, animals, and natural communities - dependent on these conservation lands

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First NMFS Cooperative Agreement in Place

During 1996, Massachusetts became the first state in the country to obtain a comprehensive endangered species cooperative agreement with the National Marine Fisheries Service (NMFS). This agreement, established under Section 6 of the federal Endangered Species Act, returns to the MA DFW joint authority to protect federally endangered and threatened **marine** species. A similar agreement between the Division and the U. S. Fish and Wildlife Service covering non-marine endangered species has been in place since 1979.

The Program's Director, Dr. Tom French also continues to serve as Chair of the Northeast Whale Recovery Plan Implementation Team. This team was established by the NMFS to advise the Service on issues relating to the recovery of the Northern Right Whale and Humpback Whale.

In This Issue.....

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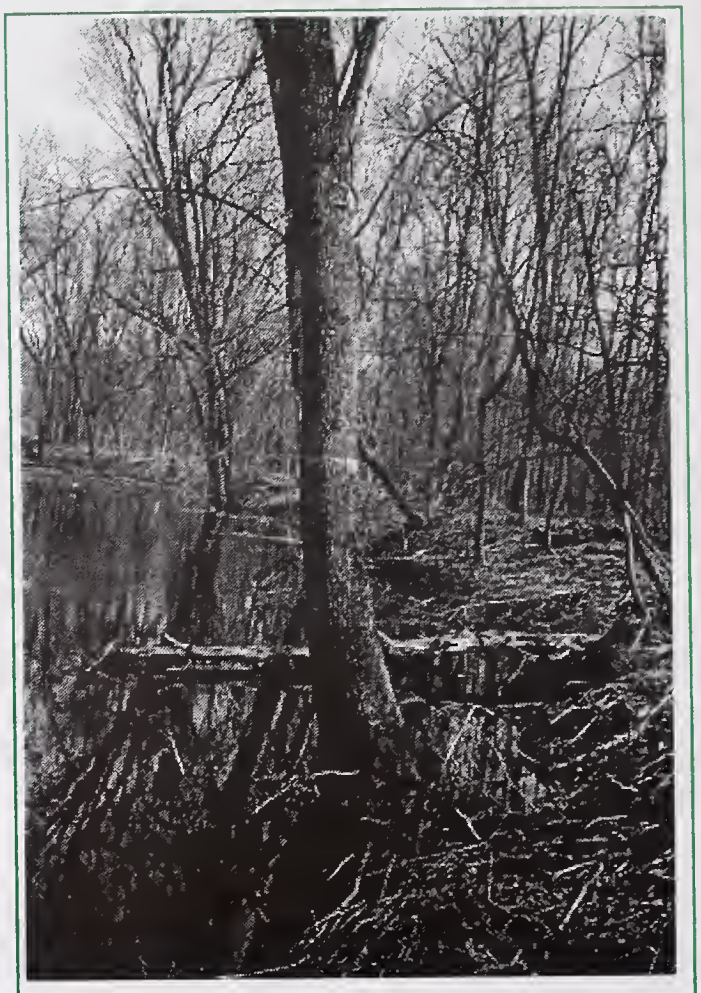
Floodplain Forest Inventory and Vegetation Classification Project

Floodplain forests, which develop next to rivers and streams that flood regularly in the spring, are considered to be among the rarest and most threatened natural communities in Massachusetts. Due to the high fertility and scenic qualities of these sites, they have largely been converted to agriculture or lost to housing and industrial development. In 1996, the Natural Heritage Program began an intensive survey of the state's rivers to identify floodplain forest communities and to define the variation in vegetation observed across the range of hydrologic, physiographic and climatic conditions occurring in the Commonwealth.

Using topographic maps, air photos and soil surveys, we identified 144 potential floodplain forest sites on 30 rivers. During the 1997 field season we made site visits to 86 sites and collected quantitative and qualitative community data and environmental data with the dedicated help of Rebecca Anderson and other volunteer field assistants. Analysis of the data indicates that there are seven distinct forest community types along the rivers included in the study, each with unique vegetation, soils and physical features (see Table). Three of the forest types identified can be considered true floodplain forests because they receive annual overbank flooding and alluvial silt deposition. All three have silver maple as either the dominant or co-dominant overstory tree species, a very sparse-to-absent shrub layer and a low diversity, dense herbaceous layer dominated by ferns (***Matteucia struthiopteris*** or ***Onoclea sensibilis***) and/or nettles[either stinging (***Laportea canadensis***) or false (***Boehmeria cylindrica***)].



Floodplain Forest. Note high water line on tree.
Photo by Jen Kearsley

Only ten high-quality examples of the floodplain forest types, ranging in size from 12 to 55 acres, currently occur in the Commonwealth; five of those are examples of major-river floodplain forest (types 1 & 2, Table 1) and five are examples of the small-river variant of floodplain forests. Most (8 of 10) occur in the Connecticut River drainage basin. A notable exception is an excellent small-river floodplain forest on the Three Mile River in Taunton. Other examples of floodplain forest communities occur in the state, but they are smaller remnants (less than 10 acres) and/or highly degraded by clearing and non-native plant invasions.

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Forested Floodplain Communities of Massachusetts Rivers

Community Name and Species Indicators	Location	Rare plant associates (E=State endangered, T=State threatened)	Rivers
Major-River Floodplain Forest - Island Variant silver maple- cottonwood-boxelder-ostrich fern association	forested islands of major rivers	---	Connecticut Deerfield Housatonic
Major-River Floodplain Forest silver maple-cottonwood-stinging nettle association	mainstem of major rivers	*Arisaema dracontium* (T)	Connecticut Deerfield Housatonic
Small-River Floodplain Forest silver maple-false nettle-sensitive fern association	tributaries with low-lying floodplains	*Mimulus alatus* (E) *Rumex verticillatus* (T) *Carex typhina* (T) *Carex grayi* (T)	CT River trib. Three Mile Ipswich
Riverbottom/Streambottom Forest red maple-swamp white oak association	seasonally-flooded areas along most small rivers; common	---	Blackstone Taunton Concord Assabet
Riverside/Streamside Mesic Deciduous Forest red/silver maple-hickory-basswood-black cherry association	riverbanks with periodic flooding	---	Westfield Squannocook Millers Taunton
Riverside forest river birch association	limited to the Merrimack River drainage	---	Merrimack Shawsheen
High-Energy Riverbank Community cobble bar cottonwood-sycamore association	cobble bars of high-energy rivers	---	Westfield Deerfield

Although five of the high-quality floodplain forest sites occur on either public land or privately-owned conservation land, all are threatened by some form of disturbance. The greatest threat is from campers who clear areas within the forests for campsites and latrines. Openings in the canopy and soil disturbance allow shade-intolerant non-native plant species to establish. **Japanese knotweed (*Polygonum cuspidatum*)** currently poses the greatest threat to classic floodplain forests because of its ability to spread rapidly and shade out all other herbaceous plants.

Floodplain forests ***clearly are*** one of the most rare and threatened of our natural communities. The results of our inventory project provide necessary information for land acquisition and for protection and management planning. We are currently working with New Hampshire and Vermont Heritage Program ecologists to assess the quality of our floodplain forests in a regional context, and to determine the degree of variability in vegetation at a regional scale. The vegetation data will be incorporated into both our state vegetation classification and the regional vegetation classification system which is a collaborative effort between state Heritage Programs and the Nature Conservancy.

This project was made possible by a grant from the U.S. Environmental Protection Agency.

- Jennifer Kearsley -

1997 Small Research Contracts Program Results

The Natural Heritage & Endangered Species Program's Small Research Contract projects this past year include inventory of three Army Corps of Engineers (ACOE) properties, a survey of the Appalachian Trail Corridor (to be continued for one more year), and mussel surveying and tiger beetle monitoring for the USFWS's Silvio O. Conte Refuge.

The ACOE has been evaluating the natural resource values of their flood control properties in an effort to include sensitive and exemplary habitats into their master planning process, and thus potentially provide additional protection to these areas. ACOE contracted with NHESP in 1997 to inventory rare or protected species and outstanding natural communities at three ACOE properties. NHESP subcontracted with twelve experts in various taxa to conduct the surveys.

The **West Hill Dam** and the **Westville Lake** properties are both located in south central Massachusetts and are characterized by habitats that are common to the state. Some of these habitats are stressed by the effects of the flood control operations, and thus a diversity of rare species and unique natural communities was not expected.

The wetland mosaics on both properties constituted the largest core of mixed habitats and were important for rare and common species alike. A total of 34 **vernal pools** were located on both properties which provided habitat for the **Spotted turtle, Wood turtle**, and **Mystic Valley amphipod** (all Special Concern). Two **Southern New England Seepage Swamps - Atlantic white cedar association** (tracked by NHESP) were documented on the West Hill property, and a large **cedar swamp**, not of high enough quality to be tracked, was located on the Westville property. Both the **Spotted turtle** and the **Hessel's hairstreak butterfly** (both Special Concern) were observed utilizing the cedar swamps on both properties. The Hessel's hairstreak is dependent upon cedar trees as a larval food source. A second occurrence of Hessel's hairstreak was documented at West Hill in a meadow located adjacent to one of the cedar swamps. This meadow proved to be an important habitat component for the butterflies of West Hill, as sixty-eight per cent of all butterflies observed on the property were seen nectaring on the numerous wildflowers in this meadow.

The West River, within the West Hill property bounds, is a slow moving river with abundant submerged and emergent vegetation. This habitat type is generally not suitable for many of the rare freshwater mussel species, and only the **Triangle floater** (Special Concern) was found in small patches of appropriate habitat. The Quinebaug River at the Westville Lake property was more suitable in part because of the slightly steeper river gradient: the river flow is slow to moderate and the substrate is firm yet penetrable enough for the mussels to embed. The **Triangle floater** and **Squawfoot** (both Special Concern) were found in good densities in this habitat. Further downstream, where the river becomes more impounded due to the dam and aquatic vegetation and siltation increase, only the Triangle floater was found very infrequently.

Between five and six hundred plant taxa were identified on each of the properties and twenty-two per cent of those (on each property) were identified as non-native. The non-native plants do not currently pose a threat to the native flora, however, they are considered a potential threat as there is ample opportunity for continued introductions via the many disturbed areas of the properties (such as trails, quarries, and spoils piles).

The **Knightville Dam** property is located ono the Westfield River in the Connecticut Valley region of Massachusetts. Habitats of this property were expected to be more diverse primarily due to varied topography, moderately steep slopes, and the presence of some calcareous bedrock.
One exciting find included the documentation of several patches of **rich mesic forest** (tracked by NHESP) on the east-facing slopes of the western side of the East Branch of the Westfield River. The typical high calcium content of these forests supports a diverse and distinct flora including numerous spring emphemerals and rare plant taxa, such as: **Trefoil sanicle** (watch list)**, Hitchcock sedge** (Special Concern), **Goldie's fern** (watch list), and **Long-spurred Violet** (watch list). Other community types supported additional rare plants: **Muskflower** (Threatened) was documented in a river oxbow where an exotic knotweed is considered to be a serious threat; and a previously documented **Wild Senna** (Endangered) population was relocated in a shrubby floodplain. Attempts were made to locate additional wild senna plants, but none were found.

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Another exciting find was the presence of male **Cerulean Warblers** holding territory. The Cerulean Warbler has no official state rank, but it is being considered as a candidate for possible federal listing as endangered. A Cerulean Warbler Atlas Project (CEWAP) is being conducted out of Cornell University, and the data from the Knightville site will be included in this study.

The riverine habitat, generally quick moving with an abundance of riffles, relatively shallow depth, and a boulder/cobble substrate, provided a wealth of habitats for rare species. This habitat is ideal for odonates (dragonflies and damselflies), and although three rare species were found, a surprisingly low overall species diversity was noted. The **Twelve-spotted Tiger Beetle** (Special Concern) was found in several locations utilizing the gravel and sand bars. The shrub/weed covered banks, fallen trees, and abundant supply of invertebrates and small fish in the river, provided the appropriate habitat for **the Northern water shrew** (Special Concern). One specimen was trapped, which is only the second water shrew ever caught west of the Connecticut River in Massachusetts (the first was captured in Monterey, MA. in 1953).

- Marea Gabriel -

A Fresh Look at Mussels

If you saw some women and 'men in black', floating in your streams and rivers, or with their heads in buckets this past summer, then you encountered the NHESP mussel task force in wet suits. In 1997 the NHESP received a $10,000 Challenge Cost Share Program grant from the Silvio O. Conte National Fish & Wildlife Refuge for the development of a freshwater mussel conservation plan for the Connecticut River drainage in MA. This plan will provide an overview of freshwater mussel distribution, and an assessment of threats, management needs and conservation status for this nationally imperiled taxonomic group.

The NHESP conducted inventories for mussels at 185 sites in the following six watersheds: Connecticut River, Westfield River, Deerfield River, Farmington River, Millers River and Chicopee River. We were assisted by interns Eve Garri and Don Pugh. Our search techniques included using glass-bottom viewing buckets and snorkeling. Habitat descriptions and land-use impact assessments were made at all sites surveyed. The 12 freshwater mussel species which occur in Massachusetts are listed in Table 1 below. Six of the 12 mussels are listed rare species pursuant to the Massachusetts Endangered Species Act (MGL c131A).

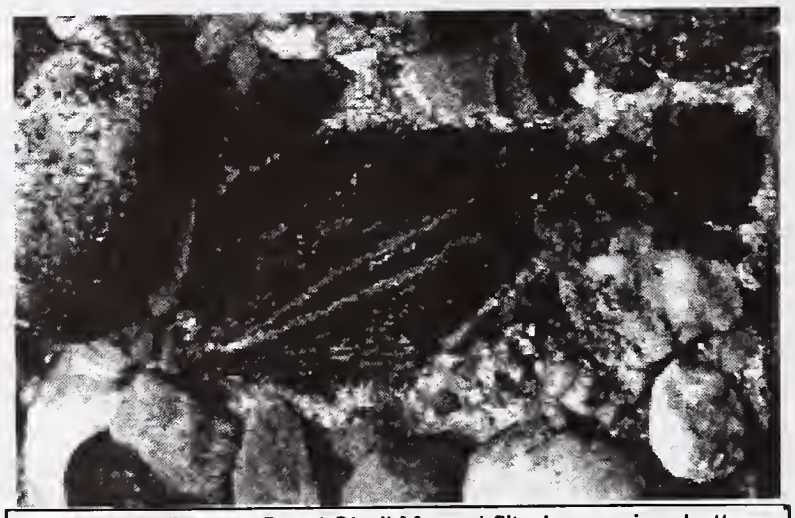


Photo of an Eastern Pearl Shell Mussel filtering on river bottom

Table 1
MA FRESHWATER MUSSEL SPECIES

Species	Status
1. Dwarf Wedgemussel	Endangered *
2. Triangle Floater	Special Concern
3. Swollen Wedgemussel	Endangered
4. Yellow Lampmussel	Endangered
5. Eastern Lampmussel	Not listed
6. Tidewater Mucket	Special Concern
7. Eastern Pondmussel	Special Concern
8. Squawfoot	Special Concern
9. Eastern Floater	Not listed
10. Alewife Floater	Not listed
11. Eastern Pearlshell	Not listed
12. Eastern Elliptio	Not listed

* Also listed as Endangered by the USFWS.

Twenty eight (28) of the 185 sites surveyed this summer supported rare species, and only 5 of the rivers surveyed supported a diversity of 5 or more species. Bachelor Brook in Granby took first prize for greatest diversity with a total of 8 species documented, including 4 state-listed species. The Ware River and Mill River (Whatley/Hatfield) tied for second place with 7 species each, 3 of which are state-listed. Our third place winner was the West Branch of the Farmington River which supported 6 species, 3 being state-listed. The East Branch of the Swift River had 5 species (and won the award for "Most Aesthetically Pleasing" river). Based on historical data, it appears that the Millers River has made the "Best Comeback" from the days when the waters ran yellow, orange and red from mill effluent. Although only four species were found, three of the species (including 2 state-listed) were widely distributed, and populations were found from the river's mouth at the Connecticut River upstream to the confluence of the Otter River in Winchendon.

Massachusetts currently has only one extant population of the federally Endangered Dwarf Wedgemussel, and, to date, this population is only known to consist of nine individuals!!! Although three historical sites for the **Dwarf Wedgemussel** were surveyed, these occurrences were not verified. The Scantic River, one of the historical Dwarf Wedgemussel sites, proved to be a great disappointment, and a nightmare to find. After two hours of bushwhacking through dense herbaceous and shrub communities (clad in wetsuits in 80 degree October weather), we finally reached the river threshold. The beavers, however, had beaten us (and the habitat) - the river habitat was seriously impacted by beaver activities and appeared no longer suitable for the Dwarf Wedgemussel or other rare mussel species. We searched desperately for three hours for a dwarf wedgemussel, only to find a scattering of the common Eastern Elliptio. Surprisingly, a few

Triangle Floaters (Special Concern) were also found! Another disappointment was Flat Brook in the town of Ware. This river supported 3 state-listed species in the early 1970's, but we found only 1 individual of a common species.

To counter our disappointments we were pleasantly surprised by the Ware River mainstem which supported healthy, reproducing populations of **Triangle Floater** and **Squawfoot** mussels. It was on this river that we made an interesting discovery: numerous young of each species were found in discrete, loose sandy patches near the river bank. We dubbed these patches "nurseries" as they were loaded with young mussels.

Based on the findings of this survey and those conducted in previous years, eight rivers are considered high conservation priorities (see Table 2), including: the Mill River (Whately/Hatfield), the Mill River (Northampton), Bachelor Brook, Stony Brook, Fort River, Ware River, West Branch of the Farmington River, and the East Branch of the Swift River. Except for the West Branch of the Farmington River and the East Branch of the Swift River, the other rivers and streams are in prime floodplain and agricultural land. As a result they are highly impacted by agricultural practices. Many fields and pastures are located along the rivers' edge where non-point source pollutants such as pesticides, fertilizers and farm animal wastes can readily drain into the waterbodies. The lack of a vegetated buffer along some sections of these streams intensifies both run-off and in-stream pollutant levels. Perhaps even more detrimental to both the physical and chemical qualities of the rivers, is the location of cow watering holes directly in the rivers. This provides an easy water source for the animals, however, the cows completely destroy the natural substrate composition, free up sediments which enter the water column, break down the banks and eliminate wastes directly into the stream. A secondary impact of concern is roadway run-off. We observed roadway ditch maintenance projects which led to hillside scour of sediment directly into prime mussel habitats.

As a result of this project we plan to produce a conservation plan which will help guide management, mitigation, restoration, inventory and protection decisions made by local, state and federal governments, industries/utilities, and others involved with the management, protection and use of the Connecticut River drainage. The Freshwater Mussel Conservation Plan for the Connecticut River Watershed in Massachusetts and distribution maps will be completed by the NHESP this spring.

-Patricia Huckery and Marea Gabriel--

Table 2

PRIORITY SITES FOR FRESHWATER MUSSEL CONSERVATION - CONN. RIVER DRAINAGE

River/Stream	Town(s)	Subwatershed	Species (see Table 1)
Mill River	Hatfield, Whately	Mill River	**1**, 2, 5, 7, 9, 11, 12
Mill River*	Northampton	Mill River	**1**, 2, 5, 7, **8**, 9, 10, 12
Bachelor Brook	S. Hadley, Granby	Connecticut River	2, **3**, 5, 7, **8**, 9, 10, 12
Stony Brook*	S. Hadley, Granby	Connecticut River	2, 5, **8**, 10, 12
Fort River*	Hadley, Amherst	Connecticut River	[**1**], 2, 5, 7, 11, 12
Ware River	Palmer, Ware, W. Brookfield, Hardwick, New Braintree, Barre,	Chicopee River	2, **3**, 5, **8**, 9, 11, 12
West Branch Farmington River	Otis, Sandisfield, Tolland	Farmington River	2, **3**, **8**, 9, 11, 12
East Branch Swift River	Petersham	Chicopee River	2, **8**, 9, 11, 12,

*Based on the work of David McLain. [ ] Dwarf Wedge Mussel considered extirpated.
State-listed species in bold.

Surveys of Two Air Force Facilities Completed

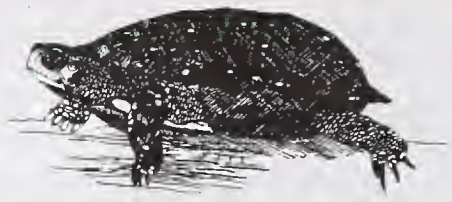
Thanks to funding from the U.S. Air Force through the Department of Defense's Legacy Program and an agreement with The Nature Conservancy, NHESP was able to complete biological surveys at two Massachusetts Air Force facilities: Cape Cod Air Force Station (also known as PAVE PAW) in Bourne, Barnstable County and the Sagamore Hill Solar Observatory in Hamilton, Essex County. The field work was performed by consulting biologists during the 1996-97 field seasons and draft final reports have been submitted.

At the 87 acre Cape Cod Air Force Station, the dry pitch pine/scrub oak habitat proved to be excellent habitat for lepidopteran species. 294 species were identified, eight of which are listed as rare in Massachusetts. Recently burned pitch pine/scrub oak with a large amount of open canopy were considered more favorable to some of the rare moths than denser unburned pitch pine stands. Conversely, lichen studies at the site suggested that lichen diversity was lower in recently burned areas. Lichens are an important component of the dry habitats at the site, so several lichen studies were funded including three investigations of individuals species and how they colonize substrates. Botanically, there is a relatively low species richness (17% of the Cape Cod flora) at the small site. Among the findings, however, were three species on the unofficial "watch list", a list of rare or uncommon species in need of further investigation or continued monitoring. Birds, mammals and mosses were also inventoried during the survey.

The Sagamore Hill Solar Observatory, while only 31 acres in size, yielded about the same species richness as the above site. Each yielded a list of 49 bird species and the number of vascular plants at Sagamore was only eight less than found at Cape Cod AFS. The site provides habitat for one state listed salamander species and two seemingly rare mosses. One of the mosses represents a state record and the other is only the second find in the state. A thorough inventory of lichens and their specific substrates completed the survey and added new information, in general, to our knowledge of this understudied group of organisms.

- Paul Somers -

Beyond the Backyard



On a "navy blue" day in April 1997, in the town of Sterling, I was in good company looking for Spotted Turtles in the middle of a mature red maple swamp. My companions were Steve Hoffman and his teenage daughter, Kristine. Steve and Kristine are not biologists (although Kristine is moving in that direction), but are residents of Sterling who came up against development in their backyard and fought back. They took steps to identify potential vernal pool and rare species habitat on their property and beyond. That's why I was there - to help them explore the "beyond". I didn't realize how far beyond their backyard they would take the conservation message. The beauty of discovering a vernal pool and the intrigue of finding and tracking a population of rare Spotted Turtles has pulled these two budding naturalists into a whole new world: one of regulations, controversy, and wonder. Steve is now a Sterling Conservation Commission member, and leads the charge to systematically identify the locations of vernal pools in town with the help the local Boy Scout troupe AND participates in the NHESP "Adopt A Spotted Turtle" study. Kristine is working capably at his side, and has expressed interest in helping us certify vernal pools (if we're lucky). Think of the environmental protection possibilities if we could clone a Steve or Kristine for every town to help identify the important areas to protect.

-Patricia Huckery -

Riverfront Area Protection Of UNcertified Vernal Pools

The 1997 Rivers Protection Act Regulations can furnish protection to uncertified vernal pools! Vernal pools are important amphibian breeding areas and habitats for rare herps (amphibians and reptiles) - 8 of the 11 state-listed rare herps which inhabit freshwater systems call vernal pools their homes. Under section 310 CMR 10.58(4)d(1)c of the Wetlands Protection Act Regulations it states, in reference to Riverfront Areas, that, "Work shall not result in an impairment of the capacity to provide vernal pool habitat identified by evidence from a competent source, but not yet certified". ***This is great news!*** There is no need to wait for the NHESP to "certify" a vernal pool before protecting it. Competent sources of vernal pool information include any person who can present the information needed to meet the requirements of the NHESP 1988 "Guidelines for Certification of Vernal Pool Habitat". Commissions should not let anyone tell them that a competent source in this case has to be a person who has at least a masters in wildlife biology or multiple years of experience in wildlife habitat evaluation. When trying to evaluate "impairment" Commissions can look at impacts to the actual pool and any possible amphibian non-breeding woodland habitat found in the uplands surrounding the pool. Since most salamanders and frogs spend only a fraction, albeit an important one, of their adult lives within the vernal pool, it is critical to protect essential upland habitat. To the extent that this upland habitat is within the Riverfront Area, it can be preserved as critical over-wintering and foraging habitat, or as a migration corridor, or even for its role in moderating the seasonal water quantity and quality entering the vernal pool.

- Patricia Huckery -

Eastern Heritage / Stewardship Conference & ABI Auction

The Massachusetts Natural Heritage & Endangered Species Program, the Eastern Regional Office of The Nature Conservancy (TNC), and the Association for Biodiversity Information (ABI) sponsored a joint conference of Natural Heritage Programs and TNC stewardship staff in the Northeast from November 3 - 7 this past fall. The conference offered biologists and land stewards from thirteen Northeastern States and adjacent Canadian Provinces excellent networking opportunities. It also provided them with a variety of intensive training workshops and concurrent problem solving sessions on many different topics, along with field trips to various locations on Cape Cod. The Conference, attended by over three hundred conservation professionals, was (according to the evaluations) a glowing success.

During the conference, an auction was held to raise funds for the benefit of ABI. ABI is a nonprofit organization established to advance the goals of Natural Heritage Programs and Conservation Data Centres. ABI assists its members in operating as a network by sharing technologies, facilitating the exchange of knowledge and experiences, and promoting the development of multijurisdictional information products and services. We would like to thank the following for their contributions to the ABI auction; Orvis, John Johnson Books, Charles River Canoe Company, New England Aquarium, Hilton Tent City, Patagonia, Westport Rivers Winery, Old Town Canoe, Essex County Greenbelt Association, Eastern Mountain Sports, Palmer River Canoe, Massachusetts Audubon Society, Bill Byrne of the Division of Fisheries & Wildlife, Northboro Frame and Photo, Earthvisions, Pam Weatherbee, and the many Heritage Program and TNC offices who donated items.

Proceeds from the auction, along with T-shirt sales and a raffle, totaled over $5,500. Thanks again to all who participated.

Tern Inventory Updates

By recent standards, 1997 was an extraordinarily good year for terns in Massachusetts for expansion to "new" sites, overall numbers, and productivity. A variety of factors contributed to these successes including improved site management practices, improved nest site availability, settled weather conditions, reportedly abundant food supplies, and less severe predation problems at most sites.

A late-nesting pair of roseate terns appeared and fledged the first chick on the Monomoy Islands in 16 years, and another pair nested at Penikese Island for the first time since the 1950's! For the first time since 1975, least terns nested at Tern Island, Chatham. Roseate Tern is listed as Endangered by the DFW (and the USFWS) while the Least, Common, and Arctic Terns are Species of Special Concern.

Common Tern: For the fifth consecutive year, numbers of common terns improved, with the total estimate ahead 7% in 1997. Some 12,016 pairs were estimated, a new "modern" high since careful recordkeeping began in 1970.

Least Tern: As a reflection of favorable nesting substrate conditions and improved beach management practices at many sites, least terns enjoyed a spectacular season, with a new all-time record high established. Both common and least terns established modern (post 1970) records for single colony size. The estimated least tern population, for the first time ever, broke through the 3,000-pair mark. Numbers rose to 3,194 pairs, 19% over the 1996 estimate of 2,673 pairs and 16% higher than the previous all-time high of 2,756 pairs established in 1995. Nesting birds were located at 49 sites in 1997 compared to 42 sites a year earlier.

Roseate Tern: Roseate terns experienced a difficult year in Massachusetts, reversing two years of strong improvement. This was attributed to untimely great horned owl predation at Ram Island, Mattapoisett, which disrupted the settlement of terns there during the critical late-May to early-June period. Roseates vacated Ram Island in large numbers, but not before the owl had taken some 42 adult birds. The state's estimate for the endangered roseate tern, after recovering to 1,743 pairs in 1996, fell back to an estimated 1,454 pairs in 1997, mostly attributable to disruption of the settlement of nesting pairs at Ram Island. The 1997 estimate for the entire northeastern U.S. population notched-up about 7% over the 1996 estimate to 3,382 pairs.

Other Species:

Arctic Terns continued at essentially the same trace level (5 pairs) noted in 1996. For the second time ever (the first being in 1991), a nesting pair of **Forster's Terns** joined a small group of common terns in the great salt marshes of Plum Island Sound. This is currently the northernmost breeding location for this species on the Atlantic Coast. **Black Skimmers** also tested their current range limits at Plymouth Beach where a pair nested, albeit unsuccessfully, for the first time since 1966. The estimated number of **Laughing Gulls** was 781 pairs, an improvement of 14% from 685 pairs in 1996.

- Brad Blodget -

Poutwater Pond Nature Preserve Dedicated

The first Nature Preserve in Massachusetts, Poutwater Pond, was dedicated in January, 1998. Located in Holden and Sterling, it contains a classic floating bog around a small pond within a buffering red maple swamp. The new 224 acre Preserve is surrounded by upland forest owned mostly by the Metropolitan District Commission (MDC), with the Division of Fisheries and Wildlife (DFW) controlling a smaller adjacent piece. MDC suggested Poutwater Pond as a Nature Preserve after purchasing the bog as part of a larger property to protect the Wachusett Reservoir watershed. MDC went way beyond the requirements of the Nature Preserve regulations and produced a model for future Nature Preserves. They organized biological inventories on the property, including a botanical survey conducted by UMass, and vertebrate surveys by their own wildlife biologists. Members of the Nature Preserves Council made several site visits and recorded birds, dragonflies, and reverified rare species on the site. Two Council members designed a boardwalk to protect the bog mat while allowing visitors to use the area: MDC installed the boardwalk just before the site was dedicated as a Nature Preserve. Anyone visiting the bog is asked to stay on the boardwalk to protect the sensitive plants and peat. Educational signs are planned for the area, but are not yet in place. Among the attractions are typical bog species such as sphagnum moss with sundews, pitcher plants, cranberries and azeleas, as well as spruce and larch. There are also occasional mosquitoes and blackflies along with dragonflies and songbirds!

Nature Preserves are established under a 1990 statute which allows DFW to set up a nature preserve system in order to identify and provide extra protection to exemplary natural communities occurring on state conservation lands. A council of citizen members and representatives from the state advises DFW on potential nature preserves and assists in putting together management plans.

Massachusetts' Nature Preserves are representatives of the state's native natural heritage and include exemplary occurrences of natural communities and ecosystems. They are intended to provide opportunities for scientific research and education on those systems. While they are open to the public, large groups need a permit from the agency managing the property. All visitors are asked to honor the sensitivity of the area and help preserve it for the future.

- Patricia Swain -

"Teaming With Wildlife"

More than 2500 conservation and recreation groups and businesses are championing a national effort to prevent declines of fish and wildlife, to ensure high quality outdoor recreation, and to meet the rising demand for conservation education. The Wildlife Diversity Funding Initiative, heralded as *Teaming With Wildlife,* offers a simple, proven mechanism to raise $350 million annually that will return to state fish and wildlife agencies for the three-fold purpose of conservation, recreation and education. The Massachusetts share....potentially as much as $4 to 6 million.

Teaming with Wildlife is a natural investment. By paying very small user fees on a wide range of outdoor equipment, from binoculars to camping gear, everyone who has a stake in a wildlife-rich outdoors will benefit. In Massachusetts, 13 companies and organizations have formally endorsed the initiative (call or write for a complete listing).

Wildlife watchers cumulatively spend big bucks, clearly benefiting local economies. This initiative will go a long way toward ensuring that the wild habitats and animals that people want to see will be well cared for.

For more than half a century, hunters and anglers have paid user fees on equipment through the Sport Fish & Wildlife Restoration Acts. Those dollars have funded the restoration of the white-tailed deer and striped bass, as well as the conservation of millions of acres of habitat.

As more people seek the outdoors for pleasure and solace, the pressures on wildlife and their habitats are increasing dramatically. For various reasons, we are seeing declines of once abundant songbirds like the meadowlark and wood thrush. Wildlife watchers are experiencing elbow-to-elbow crowds. The need for nature centers, watchable wildlife interpretation and educational materials for teachers has never been greater.

With your help, we can achieve a vision of wildlife watching experiences across America, from backyards to refuges: of proactive conservation that reverses declines of wildlife before they reach the endangered state: and of an informed citizenry who cares about the future of wildlife and habitats.

Join Team Wildlife! You can help by using your buying power as a consumer. Write letters to outdoor equipment manufacturers and retailers such as REI, LL Bean, Coleman and Pentax. Tell them you want to invest in conservation through a dedicated user fee.

For more information on the initiative, please contact Marion Larson at (508)792-7270, ext. 111.

-Article adapted from the Summer 1996 edition of "The Skimmer", a publication of the Florida Game and Fresh Water Fish Commission-

Lupines are Forever Along the Nashua River Rail Trail

Hundreds of native lupines, an uncommon plant in this state, grow in clumps along the Groton-Pepperell section of the planned Nashua River Rail Trail. The survival of this local lupine population during and after trail construction has been given an extra measure of assurance, thanks to the cooperation of several organizations and the work of volunteers. A salvage operation is being conducted to insure that both seed-rich soil and viable numbers of individual plants survive the construction process for this paved multi-use path.

Lupines: Native lupines (*Lupinus perennis*) are members of the pea family, with blue/purple flowers and stalks that are four to eight inches long. (Cultivated varieties are larger, have more robust flower stalks, and more colors than the natives.) They usually flower from mid-May to the end of June. Their compound leaves are distinctive, with seven or more leaflets attached at a central point -- like fingers off a palm -- rather than along a rib like a fern or hickory. The whole leaf is about two to four inches across. They also have nitrogen-fixing bacteria on their roots, which give them an advantage in the nutrient poor soils where they often grow. Although the long tap roots are perennial, the tops of the plants die back in the late summer, and, except for occasional dried fruit stalks, are practically invisible by fall. Several butterflies of limited distribution use the flowers for nectar and/or the leaves as food for larvae.

Low Numbers: In the early part of the century, lupines were far more common than they are now. As the forest cover has increased in this state, lupines have declined. Though not officially listed as "rare" in Massachusetts, they are on t unofficial "watch list" and tl Natural Heritage & Endangered Species Prograi (NHESP) has been tracking some of the larger populatio of lupines for several years.

In 1996, as part of the rail trail design process, the Department of Environmen Management contacted the local Conservation Commissions to inform the of the trail plans along the corridor. Cir Kollerics, a member of the Groton Conservation Commission, became concerned about the fate of the Lupine plants during construction of the trail. S contacted the Groton Garden Club and NHESP and DEM staff about a potential salvage operation. NHESP usually does not become involved in salvage operatio of species on the "watch list," since

species on the "watch list," since priority must be given to rare and endangered species. However, all were supportive of a volunteer-driven project, with the conditions that salvaged plants were to be replaced on DEM property and it was made clear to all that one can not take plants casually from state lands.

Project Design: Salvaging and replanting individual wild plants is usually a last resort for ecologists, biologists, and land managers. Habitat protection is, instead, the key. In this case, the open environment along the railbed will continue to be excellent habitat for the lupines when the rail-trail is in place. The task thus became how best to insure the survival of the plant population during construction. According to the biologist with the consulting firm hired by DEM to design the trail, the best method to start a lupine population involves taking the seed-rich soil from around existing lupines and spreading it in appropriate habitat at the new location. Transplanting individual lupines is often unsuccessful; moving young plants and watering every three days is recommended. For the Nashua River Rail Trail project, it was decided that in addition to stockpiling and then spreading seed-rich soil, a sample of individual lupine plants would be transplanted in order to create a reserve.

Implementation: The lupines were marked by both flagging nearby shrubs and putting nails in the ground next to the main stem of each lupine, so the plants could be better found with the assistance of a metal detector in the early spring. Then, during April of 1997, a group of trowel-wielding volunteers from the Groton Garden Club and other groups dug up and moved a total of about 60 plants. The lupines were re-planted about 100 feet away from the path of the construction area and flagged. The areas in which the plants originally grew were also flagged for stock-piling the soil and spreading after construction. During the summer of 1997, the Groton Garden Club tracked rainfall and provided water to the transplanted lupines at appropriate intervals. To date, there has been a remarkable 50% survival rate. When all the work is done, future users of the rail trail should continue to enjoy the sight of native lupines growing along the edge of the trail.

- Geordie Vining and Patricia Swain -

-Ecological Restoration (Continued from Page 1)

remain threatened. For example, alterations in water levels due to dam construction or water withdrawal or changes in water chemistry from offsite can alter the plant and animal communities of a protected natural area. Or, many of our dry forests, shrublands and grasslands were managed with fire for thousands of years by Native Americans. Now, lack of occasional fire has caused significant changes in those communities, decreasing habitat for many of our rare plants and animals.

Many natural communities have been changed by introduced plant and animal species that became invasive on this continent without their natural enemies to control them. Some of the invasive exotic plants and animals now dominate native communities and alter the ecological relationships. Many of our conservation areas are threatened by these non-native species.

Successful ecological restoration requires a basis of thorough scientific understanding of the natural dynamics of any system to be restored or managed. BDI's ecological restoration program has funded several projects to understand the dynamics of the ecosystems involved along with others where we have initiated needed management:

Kampoosa Bog, in Stockbridge, one of the region's finest examples of a limey wetland known as a calcareous basin fen, is threatened by the invasion of exotic plants. Common reed grass, *Phragmites australis,* has become firmly established within this Area of Critical Environmental Concern. The Nature Conservancy (TNC) began a program to eradication giant reed grass in 1995 and has since begun a study of what allowed the invasion to happen. BDI's ecological restoration program funded a UMass graduate student as well as TNC to continue and to improve the study of the hydrology and biology of the fen. The researchers are carefully documenting water chemistry of the fen and the ecological consequences of the invasion, and they continue to eradicate remaining stands of giant reed grass. Preliminary results show that road salt applied to the Mass Pike rapidly enters the groundwater going into the fen, creating conditions ideal for the growth and spread of giant reed grass.

Fire is the primary agent responsible for the continued occurrence of a ***grassland in Falmouth, a pitch pine barrens in Mashpee, and a scrub oak barrens in Montague.*** The ecological restoration program contracted with Dr. W.A. Patterson III of UMass to evaluate these areas and write fire management plans for them. Implementation of these plans will begin this year and will include conducting prescribed fires in order to maintain the desired ecological conditions.

The ***Hyannis Ponds*** area in Barnstable is well known for its remarkable concentration of rare species and its ecological integrity. It was one of NHESP's priorities for acquisition for many years before DFW acquired 357 acres there in 1994. In order to learn how to maintain this impressive area, we have contracted with TNC to expand and continue a study of groundwater influence on the rare coastal plain ponds. Land use history, fire history, and current distribution of plant communities are being studied for management and restoration of the area's oak forest, pitch pine barrens, and coastal plain pond mosaic.

Last fall the ecological restoration program conducted a prescribed fire to maintain a sandplain grassland at the ***Crane WMA in Falmouth***. Continued work there will improve and expand habitat for grassland birds, butterflies, and plants imperiled in the state while reducing invasive exotic plants that are threatening the native grassland habitat.

The ***upland habitat management program,*** BDI's second component, has reclaimed 247 acres of formerly open pastures, orchards, and early successional habitats across the state. They are working closely with NHESP and the ecological restoration program to coordinate site selection and maximize all the restoration efforts.

The ecological restoration program has begun addressing some of the fundamental issues of habitat loss on conservation land and will continue to explore ecological restoration projects across the state.

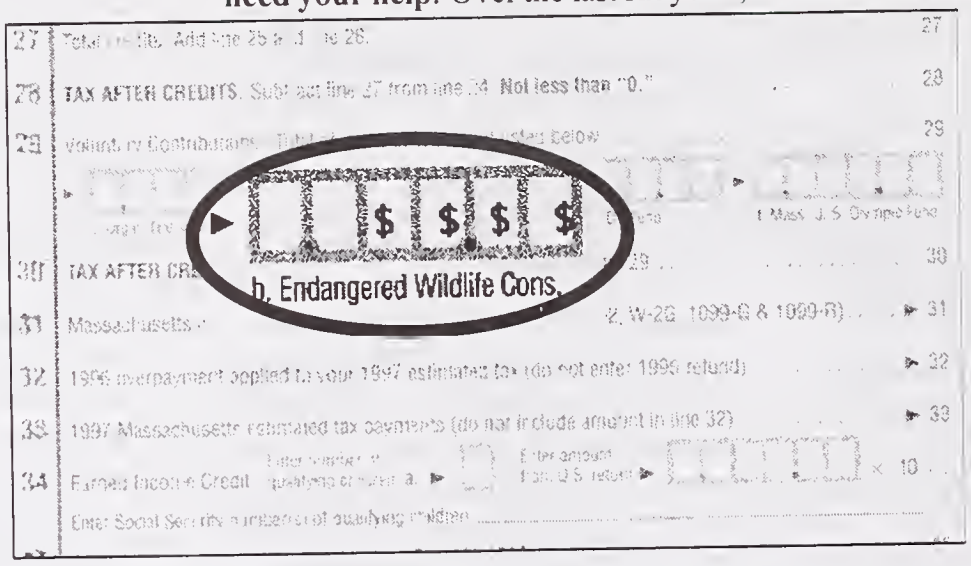
- Tim Simmons and Pat Swain -

Tax Time = Endangered Species Donation Time

A new tax year means a new chance to donate to the Natural Heritage and Endangered Species Fund on your state income tax form.

Your contribution can mean the difference between survival or loss for many plant and animal species.

Recovery efforts have saved the peregrine falcon and the majestic bald eagle. We need to do more, and **we need your help!** Over the last six years, contributions via the state income tax "checkoff" have declined 33%. This makes it extremely important that we raise the awareness of the public, as we rely greatly on these contributions to continue inventory and research as well as protection of the habitats of endangered species. Donations also allow us to create publications and materials for educational use in schools around the state. **Thank you for your donation!**



Publications

VERNAL POOL LIFE..... A RACE AGAINST DRYNESS.

A beautiful color poster was created fr twenty-six photographs to depict the m animal species for which vernal pools a essential to their life cycles. The poste a wonderful educational aide. Support the production and distribution of this poster has been provided by NHESP, Sweet Water Trust, the Vernal Pool Association, EnviroNet, and Tuft's Wr Center for Science Education. Posters be obtained by calling NHESP at (508)792-7270, x200.

FLORA CONSERVANDA--NEW ENGLAND

Since 1993, botanists from New England's Natural Heritage Programs have been meeting periodically in order to determine which vascular plant species are rare throughout New England. The thorough review of all native New England vascular plants resulted in a list of 576 plants considered worthy of listing for conservation purposes in New England. The effort was initiated as a special project of the New England Plant Conservation Program (NEPCoP). William Brumback, Conservation Director of the New England Wild Flower Society (NEWFS), directed the working group of botanists which met periodically at the U.S. Fish and Wildlife Service's office in Concord, N.H. After much research, discussion and debate about scientific nomenclature and species distributions, their efforts have resulted in the publication of the list known as "Flora Conservanda--New England" in the summer 1996 issue (issued July '97) of Rhodora, the journal of the New England Botanical Club. The list is also the theme of the last 1997 edition of New England Wild Flower, Conservation notes of the New England Wild Flower Society. The latter is a less technical presentation of the list replete with color images of many of the listed rare species. Limited numbers of each publication are available and can be obtained by contacting NEWFS in Framingham, Mass.

1998 Summary of the Massachusetts List of Endangered, Threatened, and Special Concern Species

(as listed in 321 CMR 10.60, November 1997)

Taxonomic Group	Endangered	Threatened	Special Concern	Listed Total	Total Native Species	% of Native Species
MAMMALS (including 6 whales)	7 (7 FE)	0	5	12	91	13%
BIRDS (breeding, exc. the Eskimo Curlew)	14 (3 FE, 1 FT)	6 (1 FT)	11	31	209*	15%
REPTILES (including 5 sea turtles)	8 (4 FE)***	5 (2 FT)	3	16	30	53%
AMPHIBIANS	0	2	4	6	21	29%
FISH (inland species only)	4 (1 FE)	2	3	9	39	23%
INVERTEBRATES (non-marine only)	24 (2 FE, 2 FT)	17	58	99	**	**
PLANTS (vascular)	123 (2 FE, 1 FT)	75	53	251	1,650	15%
TOTALS	**180 (19 FE, 5 FT)**	**107 (3 FT)**	**137**	**424 (27 FE or FT)**	**2,040**	**20%**

* Includes only native bird species known to nest in Massachusetts. Does not include migrants.

** The number of native invertebrate species is not known; they are therefore excluded from totals and percentages.

FE = species listed under the U.S. Endangered Species Act as **Federally Endangered** as of Oct. 1997.

FT = species listed under the U.S. Endangered Species Act as **Federally Threatened** as of Oct. 1997.

*** Does not include the Bog Turtle, as it is not yet shown as FT on the Massachusetts list.

<u>The following list changes were effective as of 14 November, 1997 in 321 CMR 10.60.</u>

Potamogeton ogdenii (Ogden's Pondweed) was **added** to the list as Endangered. A species new to science in 1983, it is restricted to alkaline ponds in three states currently. In Massachusetts, it is only known from one site.

Carex wiegandii (Wiegand's Sedge) was **dropped** from the list. Incorrectly identified specimens from Poutwater Pond in Worcester County (1905) led to the false conclusion that this species was extant in Massachusetts. While old specimens from northern Worcester County are correctly identified, there are no extant populations known in the state.

<u>Four species' status elevated to Endangered from Threatened.</u>

Gentiana andrewsii (Andrew's Bottle-gentian) - Herbarium records document that this species has declined dramatically in the state. At present, only two small populations in Berkshire County are known to be extant.

Lycopus rubellus (Gypsywort) - Only two small populations are considered to be extant for this species, which in Massachusetts was last observed in 1989.

Myriophyllum verticillatum (Whorled Water-milfoil) - The species is currently known from only one site in Massachusetts.

Potamogeton friesii (Fries' Pondweed) - In Massachusetts this species is only known from one site, an alkaline pond in Berkshire County. It has a limited distribution currently and historically in the state.

<u>Scientific Name Change</u>

Carex glaucodea (Glaucescent Sedge), changed from *Carex flaccosperma* var. *glaucodea.* Dr. Robert Naczi, who in 1991 completed a detailed investigation of the species complex containing this species, concluded that full species status was warranted.

<u>Common Name Changes for Dragonflies</u>

An official list of the common names of North American dragonflies and damselflies was accepted by the Dragonfly Society of the Americas. We changed several of our common names to follow the Dragonfly Society standards.

New Common Name	Old Common Name
Spatterdock Darner	Spring Blue Darner
Umber Shadowdragon	Twilight Skimmer
Lake Emerald	Ringed Emerald
Ski-tailed Emerald	Slender Emerald
Pine Barrens Bluet	Barrens Bluet

<u>Federal List Changes</u>

The U.S. Fish and Wildlife Service listed the northern population of the **Bog Turtle** (*Clemmys muhlenbergii*), which ranges from New York and Massachusetts south to Maryland, as **federally Threatened*** (see chart above)** on 4 November, 1997 under 50 CFR Part 17. The southern population of the bog turtle, which occurs in the Appalachian Mountains from southern Virginia to northern Georgia, was also listed as threatened due to similarity of appearance to the northern population, with a special rule. The Bog Turtle is threatened by a variety of factors including habitat degradation and fragmentation from agriculture and development, habitat succession due to invasive exotic and native plants, and illegal trade and collecting.

Staff News

Fond Farewell to **Gretchen Eliason,** the Natural Heritage Program's Information Systems Manager, who, after eleven years, left us to take the position of Senior Analyst at Boston Edison working with their Geographic Information System. We wish h the best of luck.

DIVISION OF FISHERIES & WILDLIFE

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Jack Buckley	Deputy Director, Administration

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Scott Melvin	Rare Species Zoologist
Tim Simmons	Restoration Ecologist
Paul Somers	Botanist
Pat Swain	Natural Community Ecologist

In addition, thanks to the Massachusetts Field Office of The Nature Conservancy, Julie Lundgren continues to assist us with natural community work.

The Program also relies upon interns, volunteers, and work-study assistants for their crucial help. Thanks to Ann Silveri, Scott Newbold, Rebecca Anderson, Joseph Tombs, and Shelly Sadr.

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